

CITY OF TETONIA (PWS #7410012)
SOURCE WATER ASSESSMENT FINAL REPORT

July 16, 2001



State of Idaho
Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area, sensitivity factors associated with the wells, and aquifer characteristics.

This report, *Source Water Assessment for the City of Tetonia*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The City of Tetonia drinking water system consists of one well (PWS # 7410012) serving 176 people with 120 connections. From December 1993 to October 2000 total coliform bacteria were intermittently detected in water samples taken from the distribution system. Nitrate concentrations of up to 0.8 milligrams per liter (mg/l) were also detected in the past. The Maximum Contaminant Level (MCL) for nitrate is 10 mg/l. No volatile organic compounds (VOCs) or synthetic organic compounds (SOCs) were detected in the well. In terms of total susceptibility, the City of Tetonia well water rated high for inorganic compounds (IOCs), VOCs and SOCs primarily due to agricultural land uses and the presence of potential sources of contamination in the delineated area. The City of Tetonia well rated moderate for microbial contaminants in terms of total susceptibility.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the City of Tetonia, source water protection activities should first focus on correcting deficiencies outlined in the September 2000 Sanitary Survey. Since total coliform bacteria were detected in the past, the City of Tetonia should investigate disinfection systems that can be used to treat this problem. Any spills from Highway 33, Spring Creek, or other potential contaminant sources should be carefully monitored. Other practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas should be implemented. Most of the designated areas are outside the direct jurisdiction of the City of Tetonia. Partnerships with state and local agencies and industry groups should be established and are critical to success. Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

A community with a fully developed source water protection program will incorporate many strategies. For assistance in developing protection strategies please contact the Idaho Falls Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR CITY OF TETONIA, TETONIA, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings, used to develop this assessment, is also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of this assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The City of Tetonia water system consists of a single community well serving approximately 176 people with 120 connections, located in Teton County, on Highway 33 (Figure 1).

The primary water quality issues currently facing the City of Tetonia are total coliform bacteria contamination and slight nitrate contamination.

Defining the Zones of Contribution--Delineation

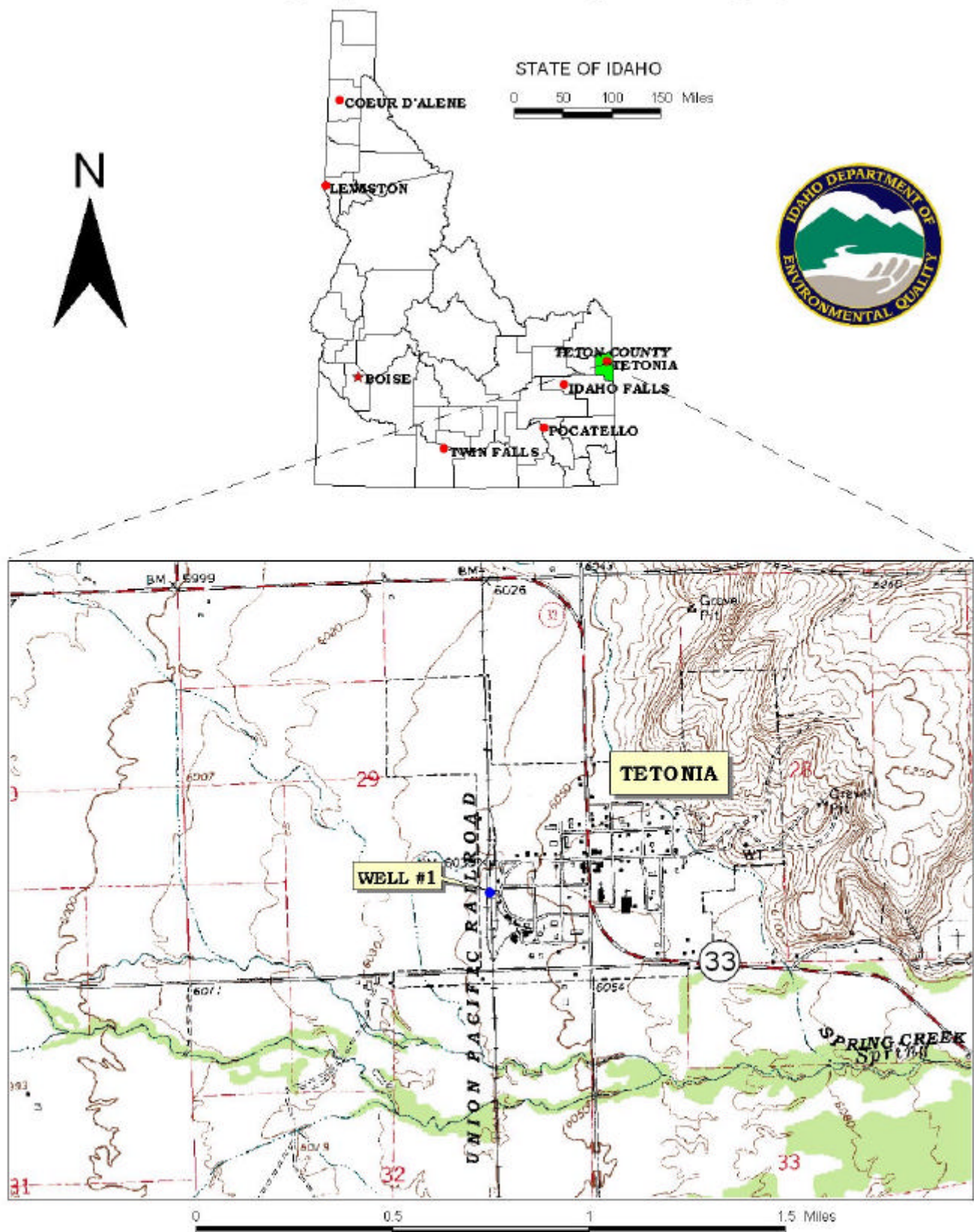
The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time of travel zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ used a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) time-of-travel (TOT) for water associated with the Teton Valley aquifer in the vicinity of the City of Tetonia. The computer model used site-specific data, assimilated by DEQ from a variety of sources including local area well logs. The delineated source water assessment area for the City of Tetonia can best be described as a corridor 0.7-mile wide and 2.1-miles long extending east, roughly parallel to Highway 33. The actual data used by DEQ in determining the source water assessment delineation area are available upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

The dominant land use outside the City of Tetonia is irrigated cropland. Land use within the immediate area of the wellhead consists of residential property, a major transportation corridor (Highway 33), and commercial property.

FIGURE 1. Geographic Location of the City of Teton



It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both, to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A contaminant inventory of the study area was conducted during January of 2001. This involved identifying and documenting potential contaminant sources within the City of Tetonia Source Water Assessment Area through the use of computer databases and Geographic Information System maps developed by DEQ.

Potential contaminant sites located within the delineated source water area (Table 1, Figure 2) include: Highway 33, Classic Stop, Chevron Products Co., a cemetery, an auto service and tire shop, four grain related businesses, a stockyard, and Spring Creek. All are located in the 3-year time of travel zone, with the exception of the cemetery which is located in the 6-year time of travel zone. Highway 33 also lies in the 6 and 10-year time of travel zone while Spring Creek lies in the 10-year time of travel zone. If an accidental spill occurred on either of these transportation corridors, the businesses, or the creek, inorganic contaminants (IOCs), volatile organic contaminants (VOCs), synthetic organic contaminants (SOCs), or microbial contaminants could be added to the aquifer system.

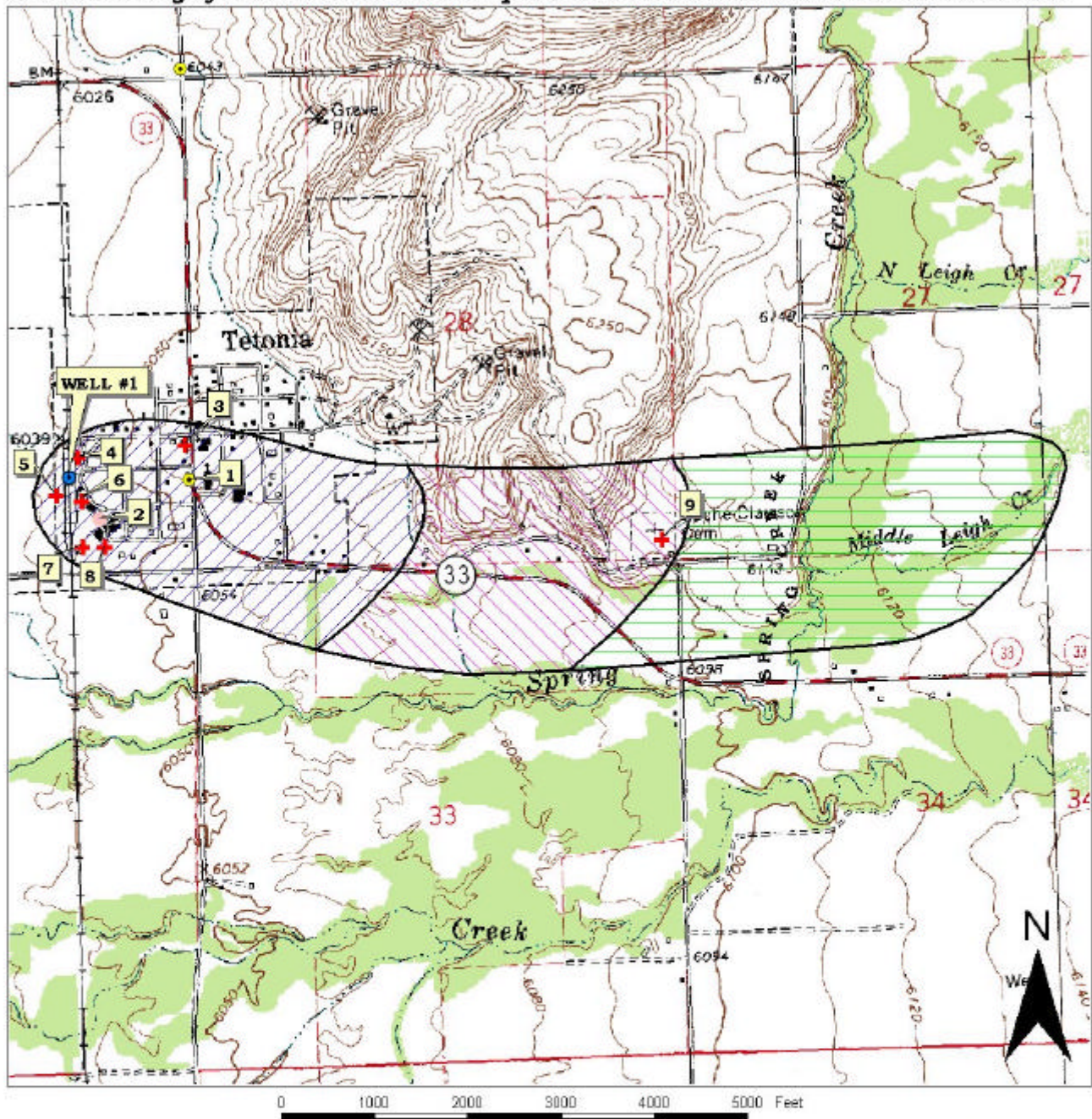
Table 1. City of Tetonia Potential Contaminant Inventory

Site Number	Source Description	TOT Zone ¹ (years)	Source of Information	Potential Contaminants ²
	Highway 33	0-3, 3-6, 6-10	GIS Map	IOC, VOC, SOC, Microbes
1	Classic Stop	0-3	Database Search	VOC, SOC
2	Barry's Chevron Products Co.	0-3	Database Search	IOC, VOC, SOC
3	Bill Sears Tire and Service	0-3	Enhanced Inventory	IOC, SOC, VOC
4	Farmer's Grain Co-Op	0-3	Enhanced Inventory	IOC
5	Stockyard	0-3	Enhanced Inventory	IOC, Microbes
6	Linderman Grain Elevator	0-3	Enhanced Inventory	IOC
7	General Mills West Grain Elevator	0-3	Enhanced Inventory	IOC
8	General Mills East Grain Elevator	0-3	Enhanced Inventory	IOC
9	Cache Clawson Cemetery	3-6	Enhanced Inventory	IOC, SOC
	Spring Creek	6-10	GIS Map	IOC, VOC, SOC, Microbes

¹ TOT = time of travel (in years) for a potential contaminant to reach the wellhead

² IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

FIGURE 2. City of Teton Delineation Map and Potential Contaminant Source Locations



PWS# 7410012
WELL #1

Section 3. Susceptibility Analyses

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

Hydrologic sensitivity was high for the well (see Table 2). This reflects the shallow depth to groundwater in the area (less than 300 feet) and well drained soils. Additionally, the vadose zone (zone from land surface to the water table) is composed of sand and gravel, which also facilitates downward movement of contaminants. The well does not have the requisite 50 feet cumulative low permeability formations to help retard the downward movement of contaminants, also contributes to the high score.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. The City of Tetonia drinking water system consists of one well that extracts ground water for domestic uses. The well system construction score is moderate for the well and reflects the deficiencies noted in the sanitary survey. The casing was extended into a low permeability unit and meets current well standards. The Sanitary Survey shows that the well is protected from flooding and has the required 50' radius buffer around the wellhead.

The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all Public Water Systems (PWSs) to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWS's follow the *Recommended Standards for Water Works* (1997) during construction. All PWS's should have a 50-foot buffer from potential sources of contamination.

Based on water chemistry data and local area well logs, the City of Tetonia well is in the upper, unconfined alluvial aquifer.

Potential Contaminant Source and Land Use

The well rates high for IOCs (i.e. arsenic, nitrate), VOCs (i.e. petroleum products), and SOCs (i.e. pesticides). The well rates low for microbial contaminants (i.e. bacteria). Agricultural land use in the delineated source area, as well as the location of Highway 33, Spring Creek, and other potential contaminant sources listed in Table 1 contribute the largest number of points to the contaminant inventory rating.

From December 1993 to October 2000 total coliform bacteria were detected in water samples taken from the distribution system. Nitrate concentrations of up to 0.8 milligrams per liter (mg/l) were also detected in the past. This is well below the MCL for nitrate of 10 mg/l.

Final Susceptibility Rating

An IOC detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well, despite the land use of the area, because a pathway for contamination already exists. One possible source of total coliform in the distribution system could be the presence of contamination in the storage tank as noted in the September 2000 Sanitary Survey. The Sanitary Survey noted that the hatch to the tank was not securely locked and could facilitate the entry of biological contamination. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 - to 3-year time-of-travel zone (Zone 1B) and much agricultural land, contribute greatly to the overall ranking.

Table 2. Summary of City of Tetonia Susceptibility Evaluation

Well	Susceptibility Scores ¹									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
1	H	H	H	H	L	M	H	H	H	M

¹H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

In terms of total susceptibility, the City of Tetonia well water rated high for IOCs, VOCs, SOCs, and moderate for microbial contaminants primarily due to agricultural land uses, the geologic composition of the vadose zone, and the nearby location of various potential contaminant sources (Table 1).

The City of Tetonia well takes its water from the shallow, unconfined to semi-confined alluvial aquifer above lower Pleistocene silicic volcanic units and Lower Permian and Middle Pennsylvanian thrust marine detritus. Ground water in the shallow aquifer is recharged primarily from surface water irrigation, direct precipitation, and canal leakage.

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully developed source water protection program will incorporate many strategies.

For the City of Teton, source water protection activities should focus on correcting deficiencies outlined in the September 2000 Sanitary Survey. Since total coliform bacteria were detected in the past, The City of Teton should investigate disinfection systems that can be used to treat this problem. Any spills from Highway 33, Spring Creek, or the nearby potential contaminant sources listed in Table 1 should be carefully monitored. Other practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas should be implemented. The new subdivision to the northeast of the City of Teton could be considered a potential source of microbial contaminants if the subdivision contains more than ten individual septic systems within a 40-acre tract. Most of the designated areas are outside the direct jurisdiction of the City of Teton. Partnerships with state and local agricultural agencies and industry groups should be established and are critical to the success of a source water protection program.

Due to the time involved with the movement of ground water, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil and Water Conservation District, and the Natural Resources Conservation Service.

Since the aquifer appears to have alternating layers of clays and sands, a deeper well could be installed to offer better protection from total coliform bacteria and inorganic contaminants for the City of Teton. Any new PWS well should meet the *Recommended Standards for Water Works* (1997) as outlined in IDAPA 37.03.09 and IDAPA 58.01.08.550. Water should be taken from beneath a confining clay layer since the upper aquifer has a higher potential for becoming contaminated.

Assistance

Public water suppliers and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Boise Regional DEQ Office (208) 373-0550

State DEQ Office (208) 373-0502

Website: <http://www2.state.id.us/deq>

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at 1-800-962-3257 for assistance with wellhead protection strategies.

POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund, is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

Idaho Department of Agriculture, 1998. Unpublished Data.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Young, H. W., Parlman, D. J., Jones, M. L., Stone, M. A. J., *Hydrologic and water-quality data for selected sites, Grand Teton National Park, Wyoming, September 1988 through September 1990*, USGS Open File Report 91-0056, 1991.

Attachment A

City of Tetonia Susceptibility Analysis Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

- 0 - 5 Low Susceptibility
- 6 - 12 Moderate Susceptibility
- ≥ 13 High Susceptibility

1. System Construction		SCORE			
Drill Date	1/1/1900				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES	2000			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	YES	0			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		3			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		6			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	3	5	5	2
(Score = # Sources X 2) 8 Points Maximum		6	8	8	4
Sources of Class II or III leacheable contaminants or	YES	3	5	5	
4 Points Maximum		3	4	4	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	25 to 50% Irrigated Agricultural Land	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		11	14	14	6
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	5	5	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0
Cumulative Potential Contaminant / Land Use Score		21	24	24	8
4. Final Susceptibility Source Score		13	14	14	12
5. Final Well Ranking		High	High	High	Moderate